

Figure 1 : Isolation of monokaryotic strain deficient in laccase activity.

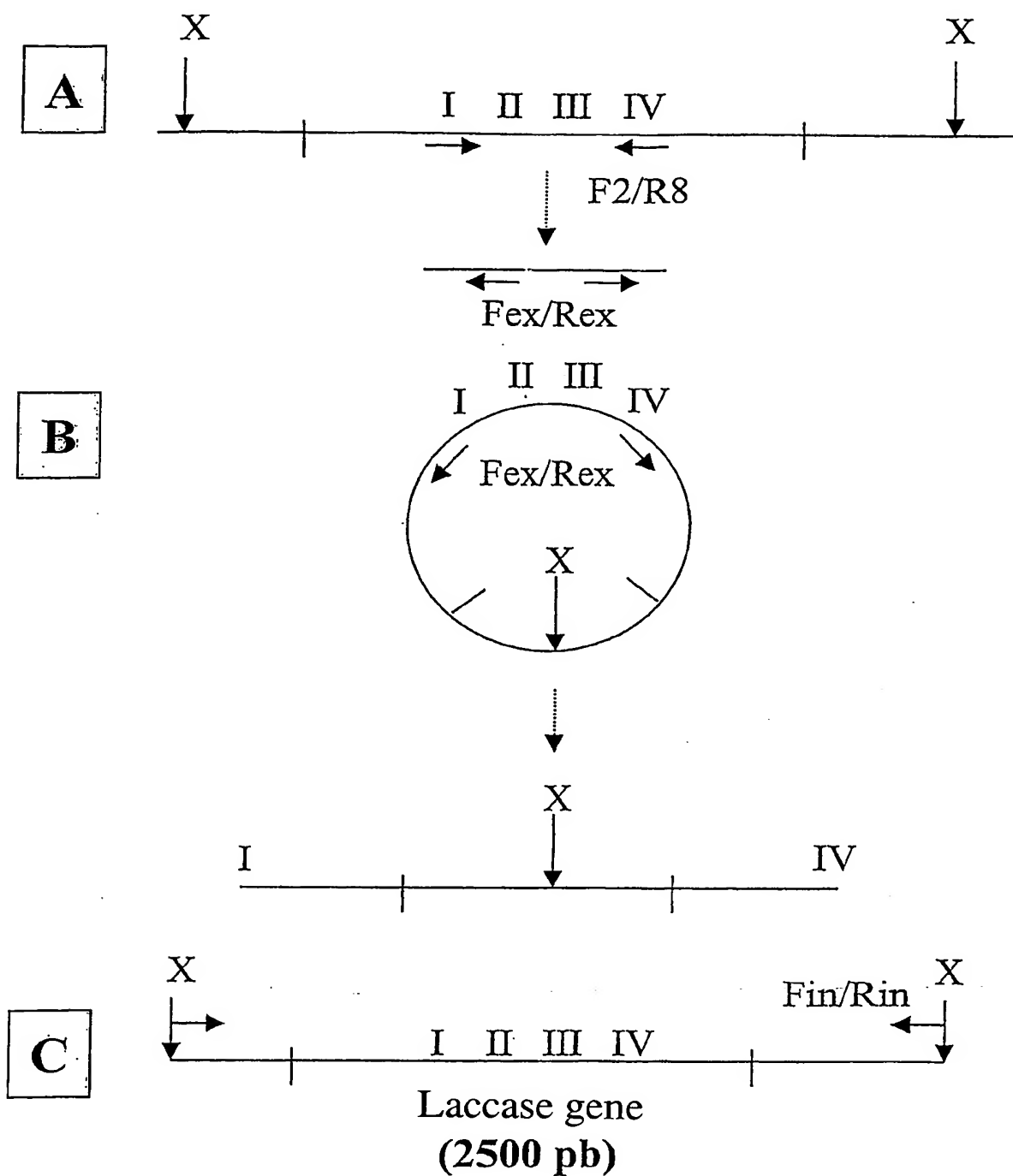


Figure 2 : Isolation of the gene coding for the laccase of *Pycnoporus cinnabarinus* laccase.

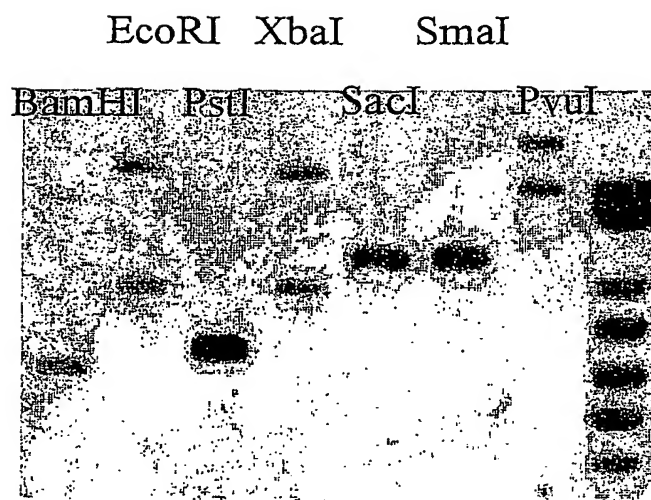


Figure 3 : Southern blot study of the gene coding for the laccase of *Pycnoporus cinnabarinus*.

GGGTATTGGGTGATGGGCAGGCGTCCTGCAG

Pycnoporus cinnabarinus

AGATCTCCGAACCAGAAATGCGATTGCGTTTCAGGCCCAATTAAGAATAAAGCTGCGTCAGGGCAGCGACGTA
 TCTTGATCCATCATTGACTCACCAGCATCGGCGTCAACACCAAAGCAAGCTCGTCCCACCCATAGGCGTGCA
 CCGGCCGGCGTGCGCCATTGAGGTACATGAGCGGGGCGAAAGTCCGCCATTGGTAGCCCTGTCGTGGACGCG
 CGGCGATGAAACGTTTCCCACCATTTGGGAAGAAACGTCTGCGGCCCATCATCCCTTCACCGGATGACAAGGC
 GCGCTCGCGCCTTTGCCGAGAGGCCGGCGGGCGACATGCACAGCGAAGGTCCGTTGCGGATGGGAAGCAGG
 CAATCAGTGGGTGTCCTACGCCGCCACGATGGTCGGGGAGCGTAGGCGCCCTCCCATAAGGCGGCAAGCATC
 ATGATGCTCTCCGATTTCGGGAAGCCTGGTGCGATGCTGGAGAGACTCTCTCCGAGAGACCAGTGTGCGCAAC
 GTTCCTGGCCTGGAAGACTTTAAAGTGAGTGTAGAGGGCGAGCAGAGGACGATCATCGGATTGCAGGAACC
 ATCGGCATCCTCAGCCTGGGAAGGATGGCTCTTGGTAGACATTCGCGGAAGGTGTCCTAGATGTGAGCGGGC
 TTCTTGGATGATCATGTGCTAACCTTTTTCTGACCTCGTCGGTGGTACGCATGGCAGGATTGAGCATTACGGT
 ATGCCTCCCATTTCATAAACGATAACCCCTTCTTTAGGTTGGTTCATCTCCATAGAGCGGCACGCTCTCAAGG
 CCTAGGCTATTACACCTCCTTCGCAACATCCCTATTACGGTGTCTGTAAGGAACGACTTGTCTATGGGATC
 ACATGAAGTGCAGCATACTGTTCCGCCGCTCTCGCAGTACAGACGCTAGTACGGGAAGTCGACATCCAAGCGT
 TCAGTACCACATGGCAAAAAAGCTGCACCATACTCTTTATGGTGAGTTGTTCTGAGTGGTATACAGTCAT
 TCATGAGGGAATGCCCACCGGATAGGGTGTGGCGGCCGCAATATTCATCGCCTGGCAATAGTCGATGTGCGT
 CTTTGTTCATGAATATCATGGGTACATGTGGAGACGGTTAAACAGCGTTGACTGTGAATCCCTGGTGTGT
 GTTGGGCCGAACAGGTACGTTGCAGGAACACCAATATCTCTTCGGCAGCCAGTTCTTTGCGAGCGGCACAG
 GCAGGCATCGCGCAACAGATCCCAGCCATCCGGCCTCTGACATTCGGGATACCTGAAGCCCTTCAGGTACGG
 AGCGAAGAGGTGGGCTCTCTGCAGCGATTGGCGGACGGATAGCTGTATTTCTCTCTCACCATTGGGAAGAT
 GTGAAAGGCTCCATCATATAGCGGCTCAACTCTACCTCGAATGTCCAAACACGGCGGGAATACTTATTTATG
 TGGACAAGGCCGAGCTATGATAGCTTGCTCCCGAAGTTGGTAAGTCCCGCAATCTGCGGTTTCAGGCAACAGT
 CTCGGAAAAATAAGAAGAATATTGTAGGTGCGTGTAGGCGTATCGCCCAAATGCGCACACACGGAGGCTTTA
 GGAGATGAAGCGCCCGTGAGCGGTAAAGGAGTTGGTTACCGCCGCCCCGACCGACTCTCTCTCTTTCCAG
 CATCATGTCTCGGCGCAAACCTTTACCCTCTATTGACCAACTCCACGAGAAAGCAGGAACAGCTTCCTTGCT
 CTCATGACGTCCGCAATCCAGACCTTAGCCGGTTGCTTACTCATCGTTATCCCTGCCGCCATGGTAGTGGA
 GTCAGCCTGGCCAGTGCCTAGTCCCGTCTCTTGTGCTGCACTAGAGAAGCCCCATGAGACAGCGTTTTTTGC
 TTTATTTCTGCTGTTTCTATAGACACCATAGGGGCAAACGATCCTGCACGCCCAGAGGTATTGGGCTCGTCA
 GATTCACGATTTTTCTCCTCGGTCTGAATCGGCTGCACGGCAGATAAATCGGCCGAAATGCTATAGCCCTT
 CATAGCCCGCTATGAGAGTCGCAAAAGGCTTGTCACTAGGTGCGTGCAGTGGCTCTCACGAAGAGCGTCAA
 CTTTCGCGCGACAGCCGCTTTTCAGGGCAAGATAGATCCTCCCATCATCCCTACTGCGCTCAGCGCCGGTAC
 CGAACAATTGACTTACCGACATCCTCCGGGACGCGCAAATGCTGTTGACGGAACGTAATCCTCTTCGTCCC
 GCCTCTTTTCGCTCTCACGCATTCCGTGTGGTTTCGCGCGACGGCCGCTCATCAGGACCAGACAGTCTCAAT
 GTCTGGTACCGGCACAATGGTGACACTGCGGCAACTGAGTAGGTCTGGTCACTCTGGTGCACCGTCGCTTAC
 GCTGACCTTCGGGATACTGTCTGCAGACATCTGGAGCGCCTGTCTTTCCCTAGTATAAATGATGTCTGTC
 CGCAGGTCTTGAAGACCGCTCGAGTCCCACTTGAGTTTTAGGTAGGACCTGTCCACCAAACCCCTCTTTCT
 GATCATG

Figure 5 : Sequence of the promoter sequence of the gene coding for the laccase of *Pycnoporus cinnabarinus* (up to the ATG coding for the methionine of the laccase).

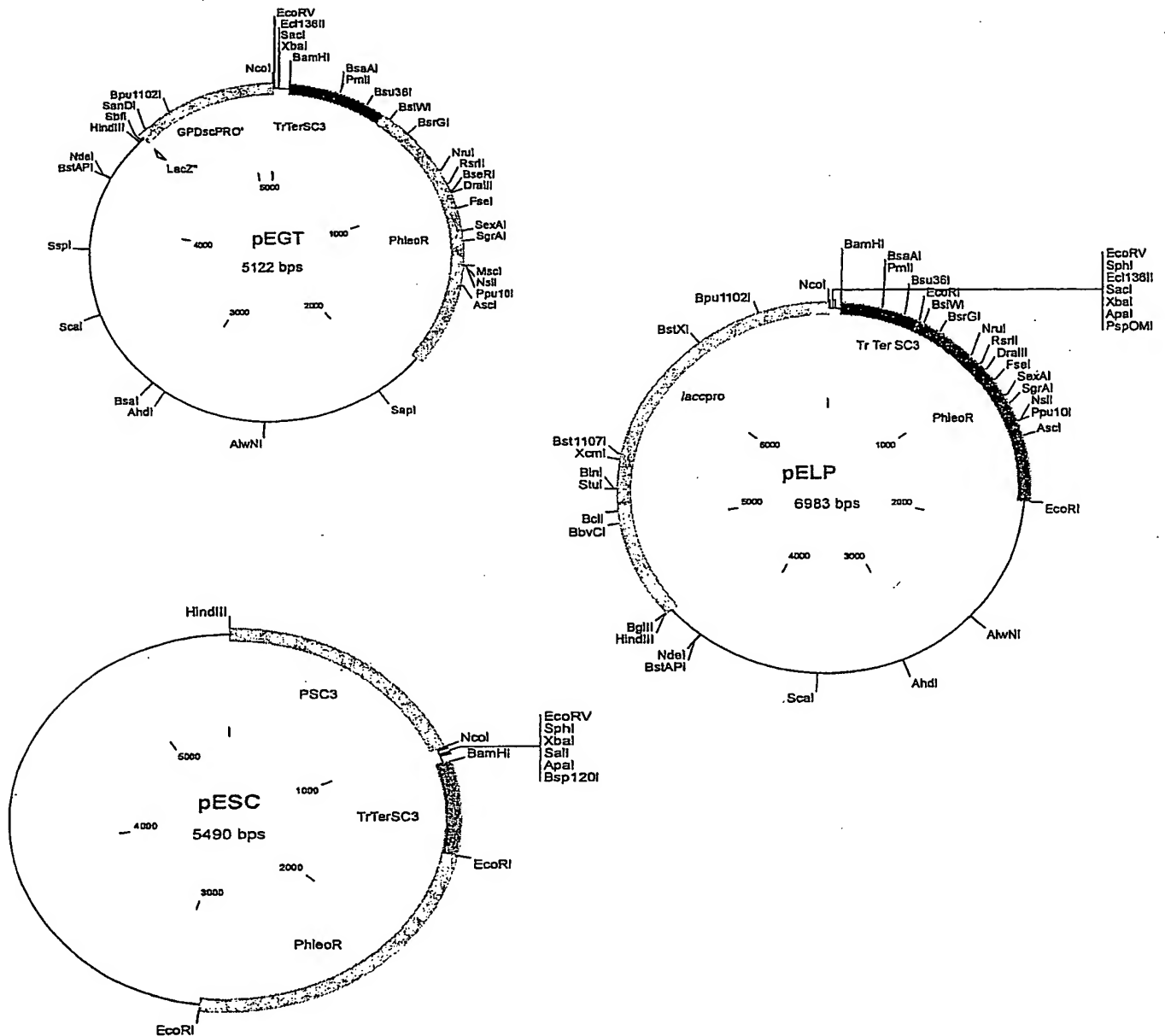


Figure 6 : Restriction map of the three expression vectors used for the production of laccase in *Pycnoporus cinnabarinus*.

CATGGGATATCGCATGCCTGCGAGACTCTAGAGTCGACGGGCGCCGTACCGCGGCCCTTAAGACGCGTGGATCCGACAGGTGAAC
 GCGCCTATCGGTGGGATATTCGGGCGACGGGAGCCTCGGCAATCTGAGCCTCGTTACTGCCTAGCAAATTCGGAATCCCTTCGATGT
 CATAGGGTCGCGGACAAGTGATCGTCTTGCTACATACTCCAAGGTGTTGACTCATTCCTCGATAAATGAACATTGTTGTTGTTG
 TTCTCTATCCGCTCAGTCACGCGACCCACACGTGCATGGTTGAACTTCGCCACGCAACAACCGCATGACGACATGGCGAACCTAAG
 TAAAGGCTGAGTCGTGACTAAAGCACTCCACTTTACGGCGAGGATGCCAGTCTACGTATGAATGAAGCCTCAGTCCCGAAGTAA
 GGGGTACAAAAGGAGGGTGAAAGTGGACGTTTCTTACCATCCTTCCACCTCCAGACCACATGCCGGGAATTCAGCTTGCT
 CAAAAAGGTTCTGCCCGTACGCCCGCGAAATTCCTTCGAGGTGGCCCTATCGCATACATGCACGACTTCAAAAACATCCATTCTATC
 ATTTTGGGATCGTACAATTATTAGACATGTTGTACAACGTTACATTCTTTCTTTTACTCTCCGGCCAGTCTATGTAGAGGTAAA
 GTACAAGCGTCCAAAGATCAGGCACTTAGAGCGCGCGCTTGTCTTCGCCGCTTAGAGCGCGCGCTCTGCTTCGCCGCGTAGACG
 AGCAGTTCGACAGACCGCGGAGTAGCCCCACTCGTTGTCGTACCAGGCAATGAGCTTACGAAGCTCTTGTGATCGCGATGCCG
 GGGATCGATCCACGCGTCTTAAGGCGCGCGGTACCCCTCGGACCCGTCGGCGCGCGTCCGACCGCGGTGTTGCTCGCGCTCGG
 TCAGTCTGCTCCTCGGCCACGAAGTGCACGCGATTGCCGGCGGGTCCGCGCAGGGCGAACTCCCGCCCCACGCTGCTCGCCGAT
 CTCGGTCAATGCCCGGCCGAGGCGTCCCGGAAGTTCGTGGACACGACCTCCGACCACTCGGCGTACAGCTCGTCCAGGCGCGCAC
 CCACACCCAGGCCAGGGTGTGTCCGGCACCACTGGTCTGGACCGCGCTGATGAACAGGGTCACGTCTGCCCGGACCAACCGGC
 GAACTCGTCCCTCCACGAAGTCCCGGAGAACCCGAGCGCTGACCGCTCCCGCGCGCGGTGAGCA
 CCGGAACGGCACTGGTCAACTTGGCCATGCATGGTGTATGGGCATTATGTGTGATGGGATGCGATGGGAGAGGGAAAGTGTCTGGATG
 GGAGTGTGGAGAAAGAGGGAGACGGCGGGCGCGCGCTTTTATACCCACGCCGAAAGATCCGATCGATACTGACAAAACGGGA
 TGAACACATCGCGCGCGCTGGACTGCGCGCCATCTGCAAAATGCCAGCGCAGTCCCGTCCGGCGCCACCACCGCCTGGTTCGAGT
 CCCCTCGAGGCGCGCTTAATCTATCCATCGCGCAATTCGAGGTCGAGTGAAGAAGTCTTCCGAGTCTTCTCGACCTTCTCGCAC
 TGGGCTGOGACCTGTCTACCTCTCATCTAACCCCTCCGCGGCTTCGCGTACAGTTACTAATCTCACACCGAAGAGGCTCTCGCGC
 CACCCTCCGATCCCGAGCACGTTCTTACATGCCACAGCGTCAGAATTGAACACAATGCACGTCARATCAGATCCCGGGGAATTCGT
 AATCATGGTCATAGCTGTTCTGTGTGAAATTTGTTATCGCTCACAATTCACACAACATACGAGCCGGAAGCATAAAGTGTAAAG
 CCTGGGTGCTTAATGAGTGAGCTAACTCAATTAATGGCTGCGCTCACTGCCGCTTCCAGTCGGGAAACCTGTGCTGCCAGCT
 GCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGGTATTTGGCGCTTCTCCGCTTCTCGCTCACTGAGTCTGCTGCTG
 GTCGTTCCGGCTGCGGCGAGCGGTATCAGCTCACTCAAAGGCGGTAATACGGTTATCCACAGAATCAGGGGATAACGCAGGAAAGAA
 CATGTGAGCAAAAAGGCCAGCAAAAAGGCCAGGAACCGTAAAAAGGCCGCGTGTGCTGGCGTTTTTCCATAGGCTCCGCCCGCTGACG
 AGCATCACAATAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATACCAAGGCGTTTCCCGCTGGAAGCTCC
 CTCGTGCGCTCTCCTGTTCGAGTCCCGCTTACCGGCTTACCGGCTTCTCCCTTCGGGAAGCGTGCGCTTCTCATAGCTC
 ACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCGCTCCAAGCTGGGCTGTGTGACGAACCCCCCGTTACGCCCCAGCGTGGCGC
 TTATCCGGTAACATATCGTCTTGAGTCCAACCCGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGA
 GCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCTTAACACGGCTACACTAGAAGGACAGTATTGGTATCTGCGCT
 CTGCTGAAGCGAGTTACCTTCGGAAGAGTTAGTGTGCTTGTACCGGCAAAACCAACCGCTGGTAGCGGTGTTTTTTGTTT
 GCAAGCAGCAGATTACGCGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGGTCTGACGCTCAGTGAACGAA
 AACTCACGTTAAGGGATTTTGGTTCATGAGATTACAAAAAGGATCTTACCTAGATCCTTTTAAATTAATAATGAAGTTTTAAATCAA
 TCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGGAGCAGCTATCTCAGCGATCTGTCTATTTCGTT
 ATCCATAGTTGCTGACTTCCCGCTGTGTAGATAACTGATACGATACGAGGGCTTACCATCTGGCCCAAGTGTGCAATGATACCGCG
 AGACCCACGCTCACCAGGCTCCAGATTTATCAGCAATAAACAGCCAGCCGGAAGGGCCGAGCGCAGAGTGGTCTGAGAACTTATC
 CGCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGCACAACGTTGTTGCCATTGCT
 ACAGGCATCGTGGTGTACGCTCGTCTGTTGTTATGGCTTCATTACGCTCCCGTTCCCAACGATCAAGGCGAGTTACATGATCCCCA
 TGTGTGCAAAAAAGCGTTAGCTCCTTCGGTCCGATCGTTGTCAGAAAGTGGCCGAGTGTATCACTCATGGTTATGGC
 AGCACTGCATAATTCTTACTGTCTATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAG
 TGTATGCGGCGACCGAGTTGCTCTTGCCCGCGCTCAATACGGGATAATACCGCGCCACATAGCAGAACTTTAAAGTGCTCATCATT
 GGAAAAACGTTCTTCGGGGCGAAAACTCTCAAGGATCTTACCGCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGACCCCACTGA
 TCTTCAGCATCTTTTACTTTCACAGCGTTTCTGGGTGAGCAAAAAAGGAAAGGCAAAATGCCGCAAAAAAGGGAATAAGGGCGAC
 ACGGAAATGTTTAATCTACTCTACTCTTCTTTTCAATATTTGAAGCATTATCAGGGTTATTGTCTCATGAGCGGATACATATTTG
 AATGTATTTAGAAAAATAAATAAATAGGGGTTCCGCGCACATTTCCCGAAAAGTGCCACCTGACGTCTAAGAAACCATTTATTATCA
 TGACATTAACCTATAAAAAATAGGCGTATACGAGGGCCCTTTCGTCTCGCGCTTTCGGTGTGACGGTGAAAAACCTCTGACACATGC
 AGCTCCCGGAGACGGTCACAGCTTGTCTGTAAGCGGATGCCGGGAGCAGACAAGCCCGTCAGGGCGCGTCAGCGGGTGTGGCGGG
 TGTGCGGGCTGGCTTAACATCGCGCATCAGAGCAATTGTATGAGAGTGCACCATATGCGGTGTGAAATCCGCAAGATGCGTA
 AGGAGAAAAATACCGCATCAGGCGCCATTCCGCAATTCAGGCTGCGCAACTGTTGGGAAGGGCGATCCGTTGCCGGCTCTTCGCTATTA
 CGCCAGCTGGCGAAAAGGGGATGTGCTGCAAGGCGATTAAAGTTGGGTAACGCCAGGGTTTTCCAGTCACGACGTTGTAAAAACGAC
 GGCCAGTGCCTAAGCTTGCATGCCTGCAGGTCGACGACCGAGCGCGGCCACCCAGCCTATCCCGCGCGGGTTCGGGACCCAAAAATAA
 GCGGGCCCCGCGCGCCCGTGGGCGAGCGGGTGTATCTACGAACGGAATGGAGGCGACTCGGAAGAGTTTGGTTAGAAAGGG
 GAACACCATCGCGGACGGCCAGTGCTCTGGDCAGCTGAGCGTGCATTGTGTTCAATTCTGACCTGTGCGCATGTAAGGAACGTGCTC
 GGGATCGGAGGGTGGCGCGAGAGCTCTTCGGTGTGAGATTAGTAAGTGTACTGCGAAGCCGCGGAGGGGTTAGGATGAGAGGTAG
 ACAGGGTCGACGCCAGGTGCGGAAGGACTGCGAAGGACTGTTCTTCGACCGCGCACCTGCAATTGCGCGCATGGATAGAATAGA
 GCGTCCGCTCGAGGGGACTCGACAGGGCTGGTGGTGGCGCCGACGGGACTGGCTGGGCAATTGCGAGTGGCGCGCAGTCCAG
 GCCGCGCGCATGTGTTTATCCCGTTTGTGAGTATCGATCGGATCTTTCGGCGTGGGTATAAAAGCGCGCGCGCTCTCCCT
 CTTTCTCCAGCACTCCCATCCAGAGCACTTCCCTCTCCCATCGCATCCCATCACACAATAATGCCCATCAC

Figure 7 : Nucleotide sequence of the vector pEGT, containing the *gpd* gene promoter (4480-5112), a phleomycin resistance marker (507-1822) and the *sc3* gene terminator (71-507).

TTTCCCAGTCA'CGACGTTGTAAAAACGACGGCCAGTGCCA

Figure 8 : Nucleotide sequence of the vector pESC, containing the sc3 gene promoter (1-1033), a phleomycin resistance marker (1540-2855) and the sc3 gene terminator (1104-1540).

CATGGGATATCGCATGCCTGCAGAGCTCTAGAGTCGACGGGCGCGGTACCGCGGCGCGCCTTAAGACCGGTGGATCCGCAGGTGAACCGCGC
 CTATCGGTGGGATATTGGGGGACGGGAGCCTCGGCAATCTGAGCGCTCGTTACTGCCTAGCAAAATTCGGAATCCCTTCGATGTCATAGGGT
 CGCGGACAAGTGATCGTCTTGCTACATACTCCAAGGTGTGACTCAATCCCTCGATAATGAACATTGTTGTTGTTGTTTCTCTATCCGC
 TCACTACGCGACCCACACGTCGATGGTTGAATTCGCCACGCAACAACCGCATGACGACATGGCGAACCTAAGTAAAGGCTGAGTCGT
 GGAATAAGCACTCCACTTTACGGCGAGGATGCCAGTCTACGTCAATGAATGAAGCCTCAGGTCCCGAAGTAAGGGGGTACAAAAGGAGG
 GTGAAAGGTGGACGTTTTCTTACCATCCTTCCACCTCCAGACCACCATGCGCGGAATTCAGCCTTGTCTCAAAAAGGTTCTGCCCGTACG
 CCCGCGAAATTCCTTCGAGGTGGCCCTATCGCATACATGACCTTCAAAACATCCATTCTATCATTTTGGGATCGTACAATTATTAGA
 CATGTTGTACAACTTACATTCCTTTCTTTTACTCTCCGCCCCAGTCTATGTAGAGGTAAAGTACAAGCGTCCAAAGGATCAGGCATT
 AGAGCGCGCGCTTGTCTTCGCGCTTAGAGCGCGCGCTGCTGCTCGCCGCGTAGACGAGCAGGTGCGCAGACACGGCGGGAGTAGCCCC
 ACTCGTTGTCTACAGGCAATGAGCTTACGAAGCTCTTGTGTATCGCGATGCGGGGATCGATCCACGCGTCTTAAGGCGGCGCGGT
 ACCCCCTCGGACCGGTCCGGCCGCGTCGGACCGGCGGTGTGGTCCGCGTCAATGCTCTCTCGGCCAGAAAGTGACACGAGTTG
 CCGGCGGGTCCGCGCAGGGCGAACTCCCGCCCCACGGCTGCTCGCGGATCTCGGTCAATGGCGGCGCGGAGGCGTCCCGGAAGTCTGTG
 GACACGACCTCCGACCACTCGGCGTACAGCTCGTCCAGGCGCGCAACCCACCCAGGCCAGGGTGTGTCCGGCACCACCTGGTCTCTGG
 ACCGCGCTGATGAACAGGGTACGTCGTCCCGGACCAACCGGCGAAGTGTCTCCACGAAGTCCCGGGAGAACCCGAGCGGTCCGGT
 CAGAACTCGACGCTCCGGCGACGTGCGCGCGGTGAGCAGCGGAACGGCACTGGTCAACTTGGCCATGCAATGGTATGGCCTATGTA
 TGATGGATCGATCGATCGTCTGAGTGAAGTGCTCTGGATGGGAGTGGTGAAGAACAGGAGACCGCGCGCGCGCTTTTATACCCACG
 CCCGAAAGATCCGATCGATACTGACAAAACGGGATGAACACATCGCGCGCGCGCTGGACTGCGCGCCATCTGCAAAATGCCAGGCCAGTC
 CCGTCCGGGCGCCACCCAGCCCTGGTTCGAGTCCCTCGAGGGCGACGCTCTATTCTATCCATGCGCGCAATTGACAGGTGCGCGGTGCA
 AGAACAGTCTTCGAGTCTTCTCGCACCTGGGCTGCGACCTGTCTACCTTCACTATCTTAACCCCTCCGCGGTCTCGCAGTACAGTTACTA
 ATCTCACCGAAGAGTCTCGGCTGCGCGCAACCTCCGATCCCGAGCACGTTCTTCACTACAGCGTCAAGATTGAACAGCAATGACGCT
 ARATCAGATCCCGGGAATTGTAATCATGGTCATAGCTGTTTCTGTGTGAATTTGTTATCCGCTCACAATTCACACAACATACGAGCC
 GGAAGCATAAAGTGTAAAGCCTGGGGTGCCTAATGAGTGAAGTAACTCACATTAATTGCGTTGCGCTCACTGCCGCTTTCCAGTCGGGA
 AACCTGTCTGCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGGCTATTGGGCGCTCTTCCGCTTCTCGTCACTG
 ACTGCTGCGTCCGGTCTCGGCTGCGCGCAACCGGTATCGACTCACTCAAAAGGCGGTAATACGTTATCCACAGAATCAGGGGATAACG
 CAGGAAAGAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAGGCGCGGTGCTGCGCTTTTCCATAGGCTCCGCCCC
 CCTGACGAGCATCAAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCCCTGGAAG
 CTCCCTCGTGGCTCTCTGTTCCGACCTGCGGCTTACCGGATACCTGTCCGCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCATAGCT
 CACGCTGTAGGTATCTCAGTTCGGTGTAGGTGCTTCCGCTGAGTGGCTGCTGACGAAACCCCGCTCAGACCCCGCTGCGCTGCGCTT
 ATCCGTAACCTATCGTCTTGAAGTCCAAACCGGTAAAGACAGCACTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAG
 GTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGTGAAG
 CCAGTTACCTTCGGAAAAAGAGTTGGTAGCTCTTGATCCGGCAAAACAAACCACCGCTGGTAGCGGTGGTTTTTTGTTTGAAGCAGCAGA
 TTACGCGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGGTCTGACGCTCAGTGAACGAAAACTCATGTTAAGGA
 TTTTGGTCAATGAGATTATCAAAAAGGATCTTCAAGTAGCTCTTTTAAATTAAGGTTTAAATCAATCAAAAGTATATATAGTA
 AACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTCTGTTTCAATAGTTGCTGACTCCCCG
 TCGTGTAGATAAATACGATACGGGAGGGCTTACCATCTGGCCCCAGTGTGCAATGATACCGCGAGACCCACGCTCACCAGCTCCAGATT
 TATCAGCAATAAACAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGGTCTGCAACTTTATCCGCTCCATCCAGTCTATTAATTGTTGCC
 GGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTACGCTCGTCTGTTGG
 TATGGCTTCATTACGCTCCGGTTCCTCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCT
 CCGATCGTTGTGCAAGTAAGTTGGCCGAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTTCTTACTGTCAATGCCATCCGTAA
 GATGCTTTTCTGTGACTGGTGAAGTCAACCAAGTCATTCTGAGAAATAGTGTATGCGGCGACCGAGTTGCTCTTGGCCGCGCTCAATACG
 GGATAATACCGCGCCACATAGCAAACTTTAAAGTGTCTAAGTAAAGTGTCTTTCGGGGCGAAAACTCTCAAGGATCTTACCGCT
 GTTGAGATCCAGTTCGATGTAAACCACTCGTGCACCCAACTGATCTTACGATCTTTTACTTTTACCAGCGTTTCTGGGTGAGCAAAAACA
 GGAAGGCAAAATGCCGCAAAAAAGGGAATAAGGGCGACACGGAAATGTTGAATACTCACTCTTCTTTTCAATATTATTGAAGCATT
 TATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAATAGGGGTTCGCGCACATTTCCCCGAAAAAG
 TGCCACCTGACGTCTAAGAAACCATTTATCATGACATTAACCTATAAAAAATAGGCGTATCACGAGGCCCTTTCGTCGCGCGTTTCGG
 TGATGACGGTGAAAAACCTCTGACACATGCAGTCCCGGAGACGGTCAAGCTTGTCTGTAAGCGGATGCGGGGAGCAGACAAGCCCGTCA
 GGGCGCGTCAGCGGGTGTGGCGGGTGTGGGGCTGGCTTAATATGCGGCATCAGAGCAGATTGTAAGTGTGAGAGTGCACCATATGCGGTG
 TGAATATCCGCACAGATGCGTAAGGAGAAAAATACCGCATCAGGCGCCATTGCGCAATCAGGCTGCGCAACTGTTGGGAAGGGCGATCGGT
 GCGGGCCTCTTCTGCTATTACGCCAGCTGGCGAAAGGGGGATGTGCTGCAAGGCGATTAAAGTTGGGTAACGCCAGGGTTTCCAGTCAAG
 ACCTTGTAAAAACGACGGCCAGTGCCAAAGCTTAGATCTCCGAACAGAAATGCGATTGCGTTTCAAGGCTTAAAGAAATAAGCTGCGTCA
 GGGCAGCGACGTATCTTGTATCATATTGACTCACCGGCATCGGCGTCAACACCAAGCAAGCTCGTCCACCCATAGGCGTGCACCGGC
 CGGCGTGCGCCATTGAGGTACATGAGCGGGGCGAAAGTCCGCCATTGGTAGCCCTGTGCTGACGCGCGCGGATGAAACGTTTCCACCA
 TTGGGAAGAAACGTTCTGCGGCCATCATCCCTTACCGGATGACAAAGGCGCGTGCAGCCTTTGCCGAGAGGCCGCGCGGCAGATGCA

Figure 9 : Nucleotide sequence of the vector pELP, containing the laccase gene (promoter 4457-6983) , a phleomycin resistance marker (507-1822) and the sc3 gene terminator (71-507) (continuation of the sequence on the following page).

CAGCGAAGGTCCGTTGCGGATGGGAAGCAGGCAATCAGTGGGTGTCCTACGCCGCCACGATGGTCCGGGAGCGTAGGGGCCCTCCCA
 TAAGGCGGCAAGCATCATGATGCTCTCCGATTCCGGAAGCCTGGTGCGATGCTGGAGAGACTCTCTCCGAGAGACCAGTGTGCGCAAC
 GTTCCTGGCCTGGAAGACTTTAAAGTGAGTGTAGAAGGGCGAGCAGAGGACGATCATCGGATTGCAGGAACCATCGGCATCCTCAGC
 CTGGGAAGGATGGCTCTTGGTAGACATTCGCGGAAGGTGTCTAGATGTGAGCGGGCTTCTTGGATGATCATGTGCTAACTTTTCTGA
 CCTCGTCCGGTGGTACGCATGGCAGGATTGAGCATTACGGTATGCCTCCCATTCATAAACGATAACCCCTTCCTTCAGGTGGTTCATCTC
 CATAGAGCGGCACGCTCTCAAGGCCTAGGCTATTACACCTCCTTCGCAACATCCCTATTACAGGTGCTGTAAAGGAACGACTTGTCAAT
 GGGATCACATGAAGTGCAGCATACTGTTCCGCGGTCTCGCAGTACAGACGCTAGTACGGGAAGTCGACATCCAAGCGTTCAGTACCA
 CATGGCAAAAAAGCTGCACCACTCTTTATGGTGAAGTGTTCGTGAGTGGTATACAGTCATTATGAGGGAATGCCACCGGATAGG
 GTGTGGCGGCCGCAATATTCATCGCCTGGCAATAGTCGATGTGCGTCCTTGTTCAATGAATATCATGGGTACATGTGGAGACGGTTAA
 ACAGCGTTGACTGTGAATCCCTGGTGTGTGTGGGCCGAACAGGTACGTTGCAGGAACACCAATATCTCTTCGGCAGCCAGTTCCTTG
 CGAGCGGCACAGGCAGGCATCGCGCAACAGATCCCGAGCCATCCGCGCTCTGACATTCCGGGATACCTGAAGCCCTTCAGGTACGGAGC
 GAAGAGGTGGGCTCTCTGCAGCGATTGGCGGACGGATAGCTGTATTTCTCTCTCACCATTGGGAAGATGTGAAAGGCTCCATCATAT
 AGCGGCTCAACTTACCTCGAATGTCCAAACACGGCGGGAATACTTATTTATGTGGACAAGGCCGAGCTATGATAGCTTGCTCCCGAA
 GTTGGTAAGTCCCGCAATCTGCGGTTTCAGGCAACAGTCTCGGAAAAATAAGAAGAATATTGTAGGTGCGTGTAGGCGTATCGCCCAAA
 TGCGCACACACGGAGGCTTTAGGAGATGAAGCGCCCGTGAGCGGTAAGGGAGTTGGTTACCGCCGCCCGACCGACTCTCTCTTT
 CCCAGCATCATGTCTCGGCGCAAACTTTACCCTCTATTGACCAACTCCACGAGAAAGCAGGAACAGCTTCTGTCTCATGACGTCC
 GCAATCCAGACCCCTTAGCCGGTTTCGTTACTCATCGTTATCCCTGCCGCCATCGTAGTGAGTCAAGCCTGGCCAGTGGTGTAGTCCCGTCT
 CTCTTGCTGCACTAGAGAAGCCCCATGAGACAGCGTTTTTGTCTTATTTCTGCTGTTTCTATAGACACCATAGGGGCAACGATCCTG
 CACGCCCAGAGGTAATTGGGCTCGTCAGATTCCCAAGTTTTTCTCCTCGGTCTGAATCGGCTGCACGGCAGATAAAATCGGCCGAAAATGCT
 ATAGCCCTTCATAGCCCGCTATGAGAGTCGCAAAAGGCTTGTAGTCAGGTCCGTGAGTGGCTCTCACGAAGAGCGTCAACTTCGCG
 CGACAGCCGCTTTACGGGCAAGATAGATCCTCCCATCATCCCTACTCGCTCAGCGCCGGTACCGAACAATTGACTTACCGACATC
 CTCCGGGACGCGCAAAATGCTGTTCGACGGAACGTAATCCTCTTCGTCGCCGCTCTTTTCGCTCTCACGCATTCCGTGTGGTTCGCGCGA
 CGGCCGCTCATCAGGACCAGACCAAGTCTCAATGTCTGGTACCGGCACAATGGTGACACTGCGGCAACTGAGTAGGTCTGGTCACTCTG
 GTGCACCGTCCGTTACGCTGACCTTCGGGATACTGTCTGACAGACATCTGGAGCGCCTGTCTTTCCCTAGTATAAATGATGTCTGTCC
 CGAGGTCTTGAAGACCGCTCGAGTCCCACTTGAGTTTTAGGTAGGACCTGTTCTCCACAACCCCTCTTTC

Figure 9 : Nucleotide sequence of the vector pELP (continuation), containing the laccase gene (promoter4457-6983), a phleomycin resistance marker (507-1822) and the sc3 gene terminator (71-507).

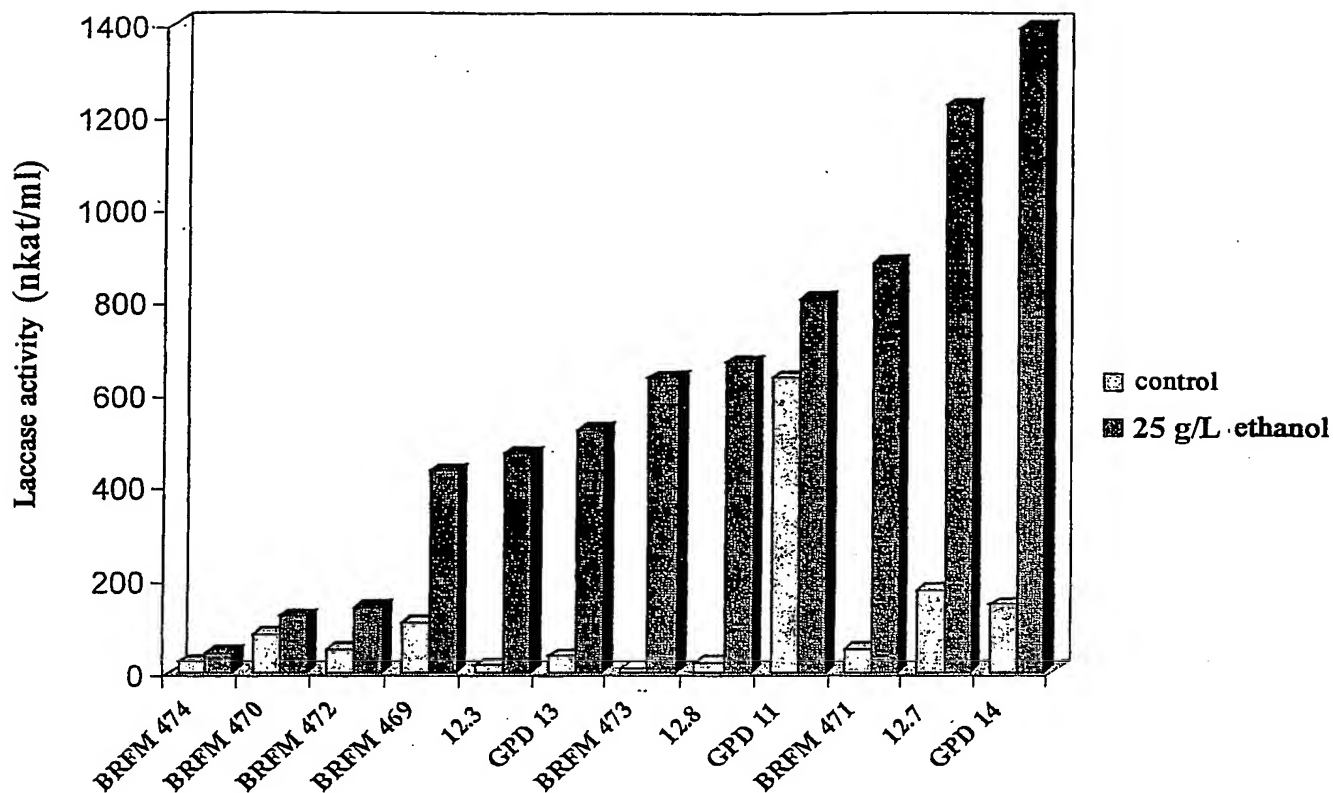


Figure 10 : Results of production of the transformants having the most significant activities. The culture was carried out with or without (control) ethanol.

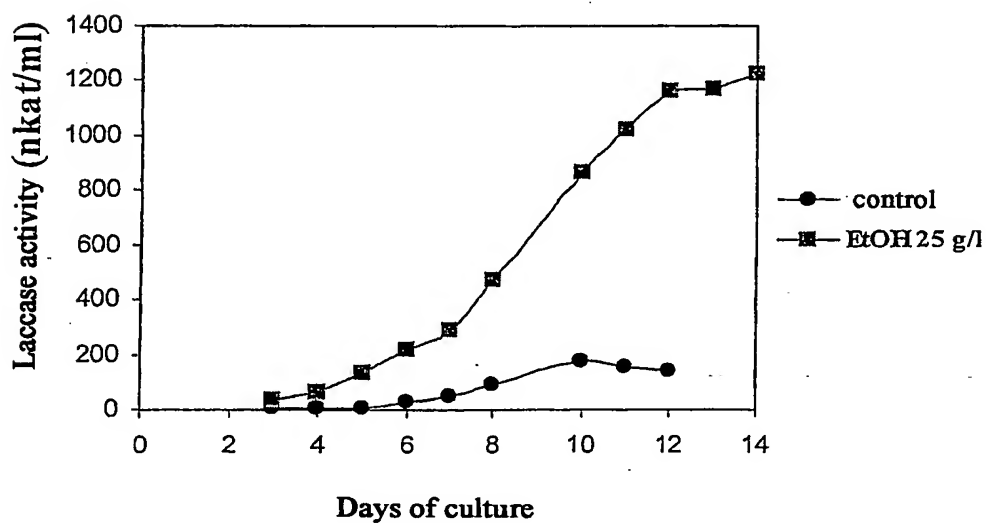
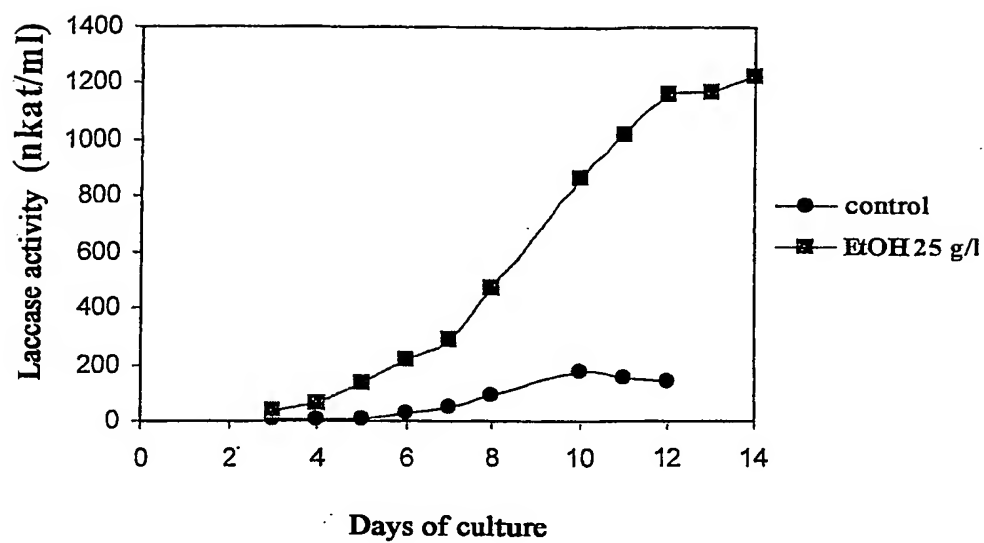


Figure 11 : Monitoring of the laccase activities of the transformants GPD 14 and 12.7 as a function of time with or (control) without ethanol

TGGGGAGATGGTTCTATATATCAAAATGATCTTCTGTCTGAGCTTCTCTGCTCTTGTGTTTCTGCTTGTGAGTCCCGGACATGCTTTTATTAAACCAT 100
 TGGCGAGCTGCCCGCGCCCAAGGAGATAGCATAATCGCCTGAGAAACCTAGTCTGTCTCATGGCGGTGTAAACGTTCTTGGGACTTATTTTCGCACTTCTC 200
 TCAGAATATAAAGGCTATTGTGATACGGTTCTAARCCCGAGCTCCCTCGAAGAGTGGGCTGCTCTCACTCTTCGCATTCCTTACTGCTTTAAA 300
 CTGAGTTTCATGCCGCTGTGGGTCCTGTTACGGACTTAACACTGATCGTAGATACTGTGCCCCGACGGTGTCTTTTCGCGCGGGAGGGTGAAGACTTTG 400
 S V H A A V G P V T D L T L I V D T V A P D G A A F A R E 43
 CGACTGTAAATGCCGGATTGTAGTTTCTAATTATAATCTTCCAGCCATGTGCGTCCAAGAGGAACCAAACTCCGTCATTTGGTCCGGTCATCGTAGGTGGG 500
 L D S P N M R Q S T S I H W H G I P Q G N 60
 TAGCTACGAGTCTTCTCTCTTCTCATTTAGCTCATCACCAAGTGATATGATATTAAATTAAGGTCAAAGGGGGACAACCTTCGGCTCAATGTTATCAACAAT 600
 TTGGATTCTCCGAACATGCGCAATCTACTTCCATTCATTGGCATGGCATCTTCCAAGGAAACGGTAGCTGGTATATCGGATATCTATCTGTATCCATT 700
 GACTCGAATATAGGTGCAATTTGGGCTGGTGGCTTGGCCTTCTGAAGCCTGCTCGAATTTATCTTCTGAATTTTATAGATGGCGCGCATTCGTTAAC 95
 AGSTAAGGAGATGTTCTGCTTCCGTTCCCTCCAGAACTAATTACTAGTGCCCATTTGCCCGGAGGGGACTCGTTCTTGTACGACTTTACCGAACCT 800
 Q C P I A P G G D S F L Y D F T E P 107
 TTCAGACTGGCACATTTTGGTATCATTCCCATTTATCAACTCAATACGACTGGAGTGGAGGAGCATTCGTCGTTCTCTTCTTCTCATCAAGTCA 1000
 F Q T G T F W Y H S H L S T Q Y C D G L R G A F V 150
 CCGCTTCTTCTCACTTATCTAGATCTACGATCCGCTCGACCTTACCGGTTGCTCTACGATGTGACGACGAGTGCATCTGTGATTACTTGGCGGACTG 1100
 I Y D P L D P Y R L L Y D V D D E S T V I T L A D W 176
 GTACCACAGCTATGCGGAGGACATTTCTAATCGCTAGGAGATTTTCCCAAGATGTCTCTCTGCTCTCTGAATCCATGAACTAGTGACGGGACACTA 1200
 Y H S Y A E D I L I A A G D T 191
 TCCTCATCAATGGTACGGAAGATTGCGCGGAGCGGCGGAGCGCAACAGAACTATCTGTCATTACTGTTGAGCATGGAAGCGGTAGGCAATTCCTCT 1300
 I L I N G H G R F A G A G G T A T E L S V I T V E H G K R 220
 CGGCTTGTAGATGTGCTAATTTGTGATAGCTACCGATTGCGATTGCGCAATATCGCTTGTGACCCCTTGCTTGGCGTGAAGATCGATAGCCATACGAA 1400
 Y R L R F A N I A C D P W F A V K I D S H T N 243
 CCTTCGCTTATCGAAGCTGACGGTATTACTACTGTGCTGCTGACGGTGGACTCCTTCAATGTAGGCTTACCTTAGCACTTTCCCACTCTGGATCCTCT 1500
 L R V I E A D G I T T 254
 TATGACTTCCCAAGCATCTTTGTGGGCAACGATATAGTGTCTATCCTCCATGCCAACCAGCCTGTTGGAACTACTGTAAGCTGCCTAAATGTTGCATGAC 1600
 I F V G Q R Y S V I L H A N Q P V G N Y 274
 TGTCATGATCTCAACCCGCGGAGGATTCGGGCGGCTCCGAACGGCGGTGAGCAATTTCCGCGGTGGGATCGACTCGGCTATTCTCCGTTATGTTGGCGC 1700
 W I R A A P N G V S N F A G G I D S A I L R Y V G A 300
 CCCAGAAGAAGAGCCCAACACTAGTGAGGATCTCCATCCGACACACTTCAAGAGCAGGATCTTACCCCGCTGATCCTACCCGCGCGCCAGGATCCAC 1800
 P E E P N T S E D T P S D T L Q E Q D L H P L I L P G A P G I H 333
 TCCCGTGGGGCGCGGACGTTGTCCACACCGTATCAATGGAGTTTGTGAGTGTGGGAGCTTTTCTGGCCCGCTTTATTAATATATCTGGTAGGATGGC 1900
 S R G A A D V V H T V S M E F 348
 GCAAACTTCAATCTCTCTGATGGCGTGGCCTTCCA GCCGTGCTCATCTCTTTCAAAGATTTATCTAGCTGACGATTTTGAATGTAGCCCGACCA 2000
 L T I L K C S P T 357
 TGCCCGTCTTCTGCAAAATATTATCGGGAGCGCAGACTGCTAATACCCCTTCTCCCGCGGGGCTCCTTATCCAGAGCGTCCGACCAATGACATCGTGGAGCT 2100
 M P V L L Q I L S G A Q T A N T L L P A G S F I Q A S H N D I V E L 391
 CAATTTCCAGCTGTCAACGAGAGCGCTGTGCGTGGGACCGTGGCTCCCATCTTTCTTCCAGCTTGAATTTACGCTCTTTTAGACATCCAATCCATCT 2200
 N F P A V N V A A V G G F H P I H L 409
 GTGAGCGCAGCGGGACCTTTGGCTTATGGCATAAGACTTATTATTAGCATGCGCCATGCTATCGACGTATACGCTCTGCTGGAACGAACTCCGATRACT 2300
 H G H A F D V I R S A G T N S D N 426
 GGTTCATCCGCTATTTTCTTCGACTTCCATAAGATGACGATGGCTCACTATGGTTTTTACCAGCCTCGCAGAGATGTGCTATCCACCGGTACCGATC 2400
 W F N P P R R D V V S T G T D 441
 CTAATGACATGTGTACGTGTTTCTGCTATTGATGTGCCGTTTGTATTGACTGTTGGACAGCAACCTTCTGCTTCCGGGCGGACACCCGTACGTAAACTG 2500
 P N D N V T I R F R A D N P 455
 CTGAATCTCTGCTGTCTTGGTTCTCATAATCTCATCTCAGAGGTCCATGGTCTCTCACTGCCACATTGACTGGCACCTTGAACTCGGCTTTGCTTTGGT 2600
 G P W F L H C H I D W H L E L G F A L V 475
 GATTGCAGAAGCGCTAGCGAATGGGACAGCGACATTAACCTCTCTGCTGGCTGCTGTGAACCTTTCTCCCTACACTTGTCTAAGATCGCTCTAGCTG 2700
 I A E A P S E W D S D I N P A 491
 CGTGGGATGACCTATGCCCTACGTTGCTTGGCTTCTCTTTACTATTCAAGTTTCTTCACTTCACTTCACTTCACTTCACTTCACTTCACTTCACTTCACT 2800
 A W D D L C P T F A W L L F Y Y F K F P H I L N F T D M M P C R L S 525
 CAGCAGTAAATCGAGTTAAGAACTCAACGTTGACTAAGGAAAGCAAGAGCAATATGAACTCTCATTTATCTTATATCGACACATTCACATATCAA 2900
 S S N R V K N L N V D 536
 CCTACGGATTTTCTCTCGACCTGAATTTCGGTGCTAGATCCCATCTTGGTGGAGTAGGAAAGAAATTTCTTGTATAAACCCATGGGTTCTTCTACC 3000
 ATATATACATAAGCTCCGGGGGTTAGTTAATTCGT 3037

Gene of the laccase of *Halocyphina villosa*

Figure 12